REMARKS

Claims 22-38 are to be examined. The Examiner withdrew claims 39-42 from consideration in paper No. 6.

Applicants note that Examiner Farah has been very helpful in the past, and Examiner Farah is respectfully encouraged to telephone applicants' attorney for any reason to expedite prosecution.

I. The election was made with traverse.

Applicants respectfully note that the Office Action is incorrect in stating that "the election was made without traverse in paper no. 5." The election was made with traverse according to 37 CFR 1.143. Therefore, applicant preserves their right to petition under 818.03(c) and also asks that the reasoning of the traverse be responded to in the next action.

II. The priority documents should be in the US file wrapper at USPTO.

The priority document were indicated to have been received on the Form PCT/DO/EO/903 mailed June 12, 2000 from the USPTO, paper no 6. Therefore, it is respectfully requested that this matter be checked by the Examiner as it is indicated in the Office Action that the priority document was not received at USPTO. A copy of the Form is enclosed for the Examiner's convenience.

III. The 112 rejections.

The "and/or" language has been amended to read "or" in all of the claims. These are not narrowing amendments.

IV. The anticipation rejection of independent claims 22 and 35 in view of Telfair, U.S. 4,911,711

1.   The claims are not anticipated because no "microoptically active structure," i.e., no activity in the micrometer ranges (which inherently produce quantum effects) is taught. This is because,

Telfair teaches a full ablation of the eye and not a spot scanner.

2.   Elaborate structures are necessary to homogenize the radiation in a cross-sectional direction in Telfair unlike the present invention which uses a Gaussian beam formed by the distribution within the beam using a novel "microptical active structure." Therefore, the present claimed invention reduces the elements needed by using a new and different structure.

Reason 1: Applicants are familiar with Telfair because it was the priority document for EP-A-0 274 205 which was cited in the EP examination.

Telfair is much older technology than the present invention, it is for full ablation of the eye, and it only discloses (see Col. 4, lines 15-17) "the 5 to 7 mm diameter characterized beam ultimately delivered to the eye" for full ablation of the eye rather than what is claimed in claims 22 and 35 with the claimed "microoptically active structure," i.e., there is no "microoptically active structure" disclosed in Telfair as described further below.

This is an important difference because as described below in a technical quote to show what one skilled in the art would know regarding the differences between "macro" effect or "macroscopic" traditional filters as in Telfair and "microoptically active structures," quantum effects and different boundaries for the Maxwell equations are inherently used in the present claimed "microoptically active structure " and these effects are not considered in the "macro" scale used in Telfair.

From a publication for a conference on microoptics which took place in Jena, Germany in September 1999: "As a consequence of miniaturization, approximations which are valid for macroscopic optics are frequently no longer applicable. Thus, for practical purposes, microoptics is still divided into refractive, diffractive and reflective **microoptics**; but it is necessary to be aware **that diffractive effects in refractive components can no longer simply be treated as approximate with component dimensions smaller than several times 10μm, and with diffractive elements (e.g., zone lenses with only few zones) the effect of refractive index distribution is considerable.** Accordingly, from the standpoint of theoretical physics, the Maxwell equations would have to be solved taking real boundary conditions into account. If the structures are further miniaturized to dimensions in the range of wavelengths or less) quantum effects come into play. Thus, the characteristics for the transporting of photons in periodic and quasi-periodic structured media are changed

such that new component functions are possible (photonic band gap structures)."

However, Telfair which is much older technology does not invision this reliance on the inherent effects of microoptics or "microoptically active structure." Therefore for **Reason 1** above, Telfair does not teach this claimed limitation, and therefore it does not anticipate independent claims 22 and 35. The remaining claims depend from claims 22 or 35 and therefore these claims also are allowable.

Reason 2: Elaborate structures are necessary to homogenize the radiation in a cross-sectional direction in Telfair unlike the present invention which uses a Gaussian beam formed by the distribution within the beam by using the microoptical active structure. Therefore, the present claimed invention reduces the elements needed, and the microoptical active structure is a totally different and new structure.

The present claimed invention has fewer elements than Telfair as shown in Figure 2 of Telfair for example. To form a Gaussian distribution Telfair needs a very complex optical system (Fig.2) consisting of:

Entrance port

Scraper 20.

Trap 21

Beam- expanding pair of anamorphic elements 50-51

Spatial filter 52 (optional)

Scraper 53

Optical filter 55

Filter 23

In Telfair, the Optical filter 55 with spatial uniform transmission in the direction parallel to the X-axis, and with non-uniform but axially symmetric transmission characteristics in the orthogonal direction (Y) and Filter 23 absorbs a great amount of energy. In the present invention, as claimed in claims 22 and 35 the invention forms the Gaussian beam only by using the

microoptical active structure 15 (see Figure 1 of the present invention, note "15" looks like a "75" because it is a German script "1"). ***No further elements are necessary.*** The microoptical active structure changes the distribution. The absorption is very low. This is due to the claimed newer micrptic technology discussed above. This fundamental difference in structure is readily seen by comparing Figure 2 of Telfair with optical element 15 in Figure 1 of the present invention. Therefore, for this reason also, Telfair does not anticipate independent claims 22 and 35.

3.   Additional differences between the claims and Telfair which support the arguments above:

The Office Action reasons that Telfair contains a beam deflecting device 25 through which the laser beam is guided over the surface of the eye 13.

However, element 25 is not a beam deflecting device through which the laser beam is guided over the surface of the object. Rather, element 25 is a beam rotator.

Beam rotator 25 together with the characterization at 23 is helpful in case of situations in which astigmatic errors are to be corrected. The beam rotator 25 enables the surgeon to set the orientation axis of astigmatic-errors, based on the presurgical diagnosis of the particular eye 13 (see Col. 4, lines 38 to 46).

The USPTO also reasons that: "In reference to claim 23, trap 21 of Telfair et al. is provided with a diffractive and/or refractive microoptically active structure and therefore is analogous to the optical element 15 of the instant claim." It is respectfully asserted that this is totally incorrect.

Applicants believe that trap 21 has no optical element with a microoptically active structure, wherein the microoptically active structure influences the intensity distribution in the laser beam cross section in such a way that the laser beam, after passing through said optical element, has a bell-shaped or Gaussian intensity distribution as claimed in the invention. Instead, the excimer laser of Telfair itself has a Gaussian distribution about the midpoint of the H dimension. (see Col. 3, lines 47 to 55; Col. 3 line 65 to Col. 4, line 3; Figs. 3b and 3c). In fact, trap 21 has a completely different task. As shown in Fig. 3b, the intensity at both ends is greater (irregular). The trap 21 reduces the irregularities in this way. (see Col. 3 lines 47 to 64, Figs. 3b

and 3 a). Therefore, the scraper 20 and the trap 21 work as a diaphragm.

The USPTO also reasons that: "The laser beam after passing through optical element 22, has a Gaussian intensity distribution (see Col. 3, lines 47 to Col. 4, line 17). However, the laser beam itself has a Gaussian distribution in one direction. The task of element 22 is to preset at path location 10' an acceptably homogeneous collimated beam of the circular section; wherein the cross-sectional distribution of flux density is relative uniform and the circle diameter is considerably large (e.g. 14-mm). (see Col. 4, line 9 to 15). Also, the element 22 is not one element, it consists of at least 8 elements (see Fig. 2).

Concerning claim 23:

The USPTO also reasons that: Telfair et al. is provided with a diffractive and/or refractive microoptically active structure and therefore is analogous to optical element 15 in Figure 1 of the present invention. However, said trap 21 is not a diffractive and/or refractive microoptically active structure as claimed. Its possible to remove trap 21 as stated by the Examiner. But trap 21 is a complete different element and has a completely different task.

Concerning claim 24-27:

The invention of Telfair et al. is directed to methods for shaping and homogenizing the intensity inside the cross section of a rectangular laser pulse from an ultraviolet Examiner laser so as to produce a circular laser beam with a Gaussian intensity distribution that is suitable for reshaping the cornea. However, as stated above, Telfair is for a full area ablation. The excimer laser 11 emits a collimated beam of typical approximate sectional dimension 22-mm by 7-mm. The distribution in the X-direction is essentially "flat top" (see Col. 3, line 67 and the enclosed illustration for background information only of the difference in practice between flat top and Gaussian results in laser surgery). The distribution in the Y-direction is substantially Gaussian. (see Col. 4, lines 1 to 3). The beam is characterized by laterally extending irregular fringes of greater relative intensity at both ends of the width dimension. (Col. 3, lines 55 to 58).

A first beam processing means 22 forms an acceptably homogeneous collimated beam of the circular section, wherein the cross-sectional distribution of flux density is relatively uniform

and the circle diameter is considerably large (e.g. 14-mm). (see Col. 4, line 9 to 15) Elements such as traps 21 and scraper 20 remove irregularities (see e.g. Col. 3 lines 55 to 64; Figs. 3b, 3a and Col. 4, lines 3 to 6 and Fig. 3c). The large homogeneous circular beam 10' is then subjected further processing for example by filter means 23. Filter A is design to effect reduction of spherical correction. For this purpose Filter A may be characterized by a transmission profile which passes maximum beam intensity at the center and which progressively attenuates beam intensity as an increasing function of radius about the center. (see Col. 6, lines 24 to 33). For correction of hyperopia a filter with a other special design is required.

Again, the invention as claimed in claim 22, is different from this because the invention contains a pulsed laser beam, a deflection device through which the laser beam is guided over the object and an optical device is provided for changing the distribution of the radiation intensity inside the laser beam cross section and has at least one optical element with a microoptical active structure, wherein the microoptically active structure influences the intensity distribution in the laser beam cross section in such a way that the laser beam, after passing through said optical element, has a bell-shaped or Gaussian distribution, (in at least one direction).

The ablation pattern is generated by overlapping small pulses (such called spot scanner). The Gaussian distribution is helpful for forming a very smooth overall surface.

Concerning claim 28-32

These are advantageous arrangements. The use of two microoptical elements allows further improvements:

With a first microoptical elements it is possible to start with small spots and the material removal is carried out with an increasingly large spot area. In such a case only 2 microoptical elements are necessary. Because correction is the result of overlapping patterns, it is possible to get the same result by use of different microoptical elements in the presently claimed invention.

Claims 33-34

It is possible to change the pattern of treatment during a operation. Telfair would need a new

special filter (this is not realistic).

Claims 35 -38

In Telfair: no pulse laser guided over the object surface (see above too).

Therefore, for the reasons above, all of the claims should be allowable.
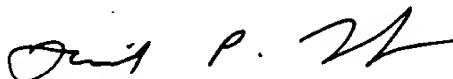
V.   An IDS is filed herewith.

A reference is disclosed with a full translation herein which shows a "microoptically active structure" for the Examiner's review.

VI. Conclusion.

In light of the *FESTO* case, no argument or amendment made herein was related to the statutory requirements of patentability unless expressly stated herein. No claim amendment or argument made was for the purpose of narrowing the scope of any claim unless Applicant has explicitly stated that the argument is "narrowing." It is respectfully requested that all of the claims be reconsidered and allowed. An early and favorable action on the merits is respectfully requested.

Please note the new correspondence address which should already have be changed automatically by customer number at USPTO. A change of address form is also attached.

Respectfully submitted,

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MARKED-UP CLAIMS

22.   (Once Amended)   A device for shaping objects by removal of material from the surface thereof comprising:

a pulsed laser beam;

a deflecting device through which the laser beam is guided over the surface of the object; and

an optical device [is] provided for changing the distribution of the radiation intensity inside the laser beam cross section [and has] having at least one optical element with a (microoptically active structure, wherein the microoptically active structure influences the intensity distribution in the laser beam cross section in such a way that the laser beam, after passing through said optical element, has a bell-shaped or Gaussian intensity distribution, or an intensity distribution similar to a bell-shaped or Gaussian distribution, in at least one cross-sectional direction.

23.   (Once Amended)   The device according to claim 22, wherein said at least one optical element [(15)] can be selectively introduced into or removed from the laser beam path for the purpose of changing the intensity distribution, wherein the at least one optical element is provided with a diffractive [and/or] or refractive microoptically active structure which is suitable for influencing the intensity distribution in the laser radiation cross section.

32.   (Once Amended)   The device according to claim 31, wherein the variable system [and/or] or the exchange wheel are provided with electronically controllable actuating drives whose control inputs, along with a control input of the deflecting device, are connected with outputs of a control unit, wherein preset data for the size of the spot area [and/or] or for the rotating movement of the exchange wheel [and/or] or for the deflecting angle are applied to the outputs of the control unit.

33.   (Once Amended)   The device according to claim 32, wherein a device is provided for detecting actual values of curvature of individual surface portions [and/or] or of the

entire surface to be treated, this device being coupled with an actual-value storage.

34.   (Once Amended)   The device according to claim 32, wherein the control unit is connected on the input side with the actual-value storage and a reference value storage, and a computation circuit is provided in the control unit for determining preset data for the size of the spot area [and/or] or for the rotating movement of the exchange wheel [and/or] or for the deflecting angle of the laser beam from comparison of the actual values with the reference values.

35.   (Once Amended)   A process for shaping objects through material removal from the surface of the object comprising the steps of:

[grinding] guiding a pulsed laser beam which is guided over the object surface; and

providing that the distribution of the radiation intensity within the laser beam [and/or] or the size of the spot area with which the laser beam strikes the object surface [and/or] or the deflecting angle for the laser beam are changed during the shaping by a microoptically active structure.